NON-PUBLIC?: N
ACCESSION #: 9201130145
LICENSEE EVENT REPORT (LER)

FACILITY NAME: Browns Ferry Unit 2 PAGE: 1 OF 05

DOCKET NUMBER: 05000260

TITLE: Automatic Reactor Scram Following a Turbine Trip Which was a Result of an Unexpected Fuse Failure
EVENT DATE: 12/08/91 LER #: 91-019-00 REPORT DATE: 01/07/92

OTHER FACILITIES INVOLVED: DOCKET NO: 05000

OPERATING MODE: N POWER LEVEL: 080

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR SECTION:
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:
NAME: Earl M. Ridgell, Compliance TELEPHONE: (205) 729-2047
Licensing Engineer

COMPONENT FAILURE DESCRIPTION:
CAUSE: SYSTEM: COMPONENT: MANUFACTURER:
REPORTABLE NPRDS:

SUPPLEMENTAL REPORT EXPECTED: NO

ABSTRACT:

On December 8, 1991 at 2320 CST, Browns Ferry Unit 2 automatically scrammed from approximately 80 percent power following a turbine trip. In addition, during this event, an unexpected loss of one of the offsite power supplies occurred.

The root cause of this event was an unexpected and unforeseen fuse (Gould-Shawmut) failure.

TVA has replaced the existing 500kV Bus Potential Transformer secondary fuses to minimize the possibility of spurious relay operations.

TVA will evaluate reconfiguring the existing plant design to eliminate the possibility that the loss of the relaying potential from a single bus will result in the loss of the generating unit. In addition, TVA will

investigate the spurious trip of Trinity line 1 line during this event and correct any identified deficiencies.

END OF ABSTRACT

I. PLANT CONDITIONS

Unit 2 was at 80 percent power operations and was slowly increasing power for fuel preconditioning. Units 1 and 3 were shutdown and defueled.

II. DESCRIPTION OF EVENT

A. Event:

On December 8, 1991 at 2320 CST, Browns Ferry Unit 2 automatically scrammed from approximately 80 percent power due to an unexpected fuse failure.

The failed fuse, manufactured by Gould-Shawmut, was located on the 500kV Bus 1 Section 1 potential transformer EL! output and resulted in a loss of restraint potential to the generator backup impedance relay, causing the relay to actuate. The restraint potential is provided to a logic circuit which ratios the potential (voltage) to the current (amperage). The loss of restraint potential is sensed by the logic circuit as an overcurrent condition, which caused the relay to actuate.

The actuation of the generator backup impedance relay resulted in a trip of the Unit 2 generator breaker and the associated supply breakers. This relay also initiated an exciter field breaker trip and subsequent turbine trip TA!. Following the turbine trip, the Unit 2 reactor automatically scrammed and all required electrical boards automatically transferred to their alternate power supply, as designed.

Following the reactor scram, the control room received indication of a low Reactor Pressure Vessel Level and entered Emergency Operating Instruction (EOI), Reactor Control. The low vessel water level resulted in actuation of the Primary Containment Isolation System (PCIS) JM!.

As a result of the automatic reactor scram and actuation of the PCIS, TVA reports this event in accordance with 10 CFR

50.73(a)(2)(iv) as an event or condition that resulted in manual or automatic actuation of any engineered safety feature, including the reactor protection system.

B. Inoperable Structures, Components, or Systems that Contributed to the Event:

None.

C. Dates and Approximate Times of Major Occurrences:

December 8, 1991 at 2320 CST Failed fuse resulted in generator load rejection, turbine trip, and automatic reactor scram. Operations received low reactor vessel water level indication, subsequent PCIS actuation and entered the EOI.

2354 CST EOI exited based on the entry conditions no longer existing.

0129 CST TVA provided four-hour non-emergency report to NRC required by 10 CFR 50.72(b)(2)(ii).

D. Other Systems or Secondary Functions Affected:

The incoming plant power line (Trinity line 1) breaker also tripped during this event. This breaker tripped due to actuation of the directional ground Phase B relay which also receives its restraint potential from the 500kV Bus 1 Section 1 Potential Transformer. This was an unexpected event which had no direct impact on plant safety.

E. Method of Discovery:

This event was immediately known to the control operator upon receiving indication of the turbine trip and subsequent reactor scram.

F. Operator Actions:

Operations verified the reactor scram and turbine trip had occurred. Reactor pressure was controlled by use of the turbine bypass valves and reactor water level was restored and controlled by use of the reactor feedwater pumps.

G. Safety System Responses:

All expected electrical boards automatically transferred to their alternate power supply following the turbine trip and subsequent loss of their normal power supply.

In addition, the PCIS system actuated following the automatic reactor scram. These actuations included group 2 (shutdown cooling mode of residual heat removal), group 3 (reactor water cleanup), group 6 (ventilation systems), and group 8 (traversing incore probes). The PCIS actuations were a result of a low water level which occurred due to the voids collapsing in the reactor vessel.

III. CAUSE OF THE EVENT

A. Immediate Cause:

The immediate cause of this event was fuse failure.

B. Root Cause:

The root cause of this event was an unexpected and unforeseen fuse failure which resulted in a turbine trip and subsequent automatic reactor scram.

C. Contributing Factors:

None.

IV. ANALYSIS OF THE EVENT

A. Safety Analysis:

The 500kV Bus 1 Section 1 potential transformer provides restraint potential to the generator backup impedance relay. The loss of restraint potential was sensed by the logic circuit as an overcurrent condition which caused the relay to actuate. The actuation of the relay resulted in a turbine trip and

subsequent plant scram.

In addition, a low reactor water level condition occurred following the plant scram. This is a normal occurrence after a pressure transient since the voids in the reactor coolant collapse.

All safety-related plant components operated as expected during the plant scram. The safety of the plant, its personnel, and the public was not compromised.

V. CORRECTIVE ACTIONS

A. Immediate Corrective Actions:

The existing 500kV Bus Potential Transformer secondary fuses were replaced to minimize the possibility of spurious relay operations due to generic fuse failures.

B. Corrective Actions to Prevent Recurrence:

1. TVA will evaluate reconfiguring the existing design at BFN to eliminate the possibility that the loss of the relaying potential from a single bus will result in the loss of a generating unit.

2. TVA will further investigate the spurious tripping of the Trinity 1 line during this event and correct any identified deficiencies.

VI. ADDITIONAL INFORMATION

A. Failed Components:

None.

B. Previous LERs on Similar Events:

None.

VII. Commitments

1. TVA will evaluate reconfiguring the existing design at BFN to eliminate the possibility that the loss of the relaying

potential from a single bus will result in the loss of a generating unit. This evaluation will be completed by February 28, 1992.

2. TVA will further investigate the spurious tripping of the Trinity 1 line during this event and correct any identified deficiencies. This evaluation will be completed by February 28, 1992.

Energy Industry Identification System (EIIS) codes are identified in the text as XX!.

TVA

Tennessee Valley Authority,
Post Office Box 2000, Decatur, Alabama 35609

JAN 07 1992

O. J. 'Ike' Zeringue
Vice President, Browns Ferry Operations

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555

Dear Sir:

TVA - BROWNS FERRY NUCLEAR PLANT (BFN) UNIT 2 - DOCKET NO. 50-260 - FACILITY OPERATING LICENSE DPR-52 - LICENSEE EVENT REPORT LER-50-260/91019

The enclosed report provides details concerning an automatic reactor scram following a turbine trip. The turbine trip was a result of an unexpected and unforeseen fuse failure. This report is submitted in accordance with 10 CFR 50.73(a)(2)(iv).

Sincerely,

O. J. Zeringue

Enclosure
cc: see page 2

U.S. Nuclear Regulatory Commission
JAN 07 1992

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